E. NOISE ELEMENT

INTRODUCTION

The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels. The Noise Element is used to guide decisions regarding land use and the location of new roads and transit facilities, since they are commonly sources of excessive noise levels. Noise levels from existing land uses, including mining and industrial activities, must be closely analyzed to ensure compatibility with planned land uses.

The Noise Element, by its nature, is the most technical of the General Plan Elements. Definitions of the acoustical terminology used in this Element are provided in Appendix F, Glossary.

The City of Rocklin includes varied geographic features. Some portions of the community are separated from the railroad, freeway and industrial areas by geographic features that substantially reduce noise levels from those sources. For those areas exposed to such sources due to the lack of intervening geographic features, alternatives for noise attenuation include soundwalls, berms and setbacks.

The best approach for future land uses is to plan their location in such a way as to minimize exposure of sensitive receptors, such as residences or schools, to substantial noise sources. Noise contours have been developed as part of this Noise Element that will be used in planning for distribution of various land uses within the community and determination of required setbacks from noise sources.

As noted in the description of existing conditions below, the major sources of noise in Rocklin are industrial areas, I-80 and the railroad. It seems unlikely that a major new noise source will be created in the community. No additional railroad routes or freeways are planned. However, the nature and extent of railroad activity on the established Union Pacific line is not subject to the control of the City, and could change during the planning period, affecting noise levels in the community. Increased frequency of passenger rail service between Auburn and the Bay Area is planned to ease congestion and improve air quality on the I-80 corridor. The extent to which freight service may increase is unknown.

Noise is also generated by urban land uses: schools, children playing, yard maintenance, dogs, outdoor activities (including amplified music), siren and airplanes. As a practical matter, most of these noise sources are recognized as a part of urban living that must be tolerated. The issue is whether some of these noise sources are so disruptive that they deserve special attention. One of the action steps included in the Noise Element Action Plan is development of a Noise Ordinance. Communities throughout the country have adopted such ordinances, sometimes in response to a specific site (such as a nightclub), or specific noise sources (such as barking dogs, car stereos or leaf blowers). The Noise Ordinance can also address single-event noise, delivery trucks, amplified sound and construction-related noise.

The emphasis of the Noise Element is to prevent future noise impacts from occurring in new development, and to minimize these noise impacts in existing developed areas of the community.

DESCRIPTION OF EXISTING CONDITIONS

Noise is often defined as unwanted sound, and its perception can be characterized as a subjective reaction to a physical phenomenon. Researchers have grappled for many years with the problem of translating objective measurements of sound into directly correlated measures of public reaction to noise. The descriptors of community noise in current use are the results of these efforts, and represent simplified, practical measurement tools to gauge community response. Table 4-10 provides examples of maximum or continuous noise levels associated with common noise sources.

Table 4-10
Typical A-Weighted Maximum Sound Levels of Common Noise Sources

Decibels	Description
130	Threshold of pain
120	Jet aircraft take-off at 100 feet
110	Riveting machine at operators position
100	Shotgun at 200 feet
90	Bulldozer at 50 feet
80	Diesel locomotive at 300 feet
70	Commercial jet aircraft interior during flight
60	Normal conversation speech at 5-10 feet
50	Open office background level
40	Background level within a residence
30	Soft whisper at 2 feet
20	Interior of recording studio

Source: Bollard & Brennan Inc., 2002.

A common statistical tool to measure the ambient noise level is the average sound level (Leq), which is the sound level corresponding to a steady-state A-weighted sound level in decibels (dB) containing the same total energy as a time-varying signal over a given time period (usually one hour). The Leq, or average sound level, is the foundation for determining composite noise descriptors such as Ldn and CNEL (see below), and shows very good correlation with community response to noise.

Two composite noise descriptors commonly used are Ldn and CNEL. The Ldn (Day-Night Average Level) is based upon the average hourly Leq over a 24-hour day, with a +10 decibel weighting applied to nighttime (10:00 p.m. to 7:00 a.m.) Leq values. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were subjectively twice as loud as daytime exposures. The CNEL (Community Noise Equivalent Level), like Ldn, is based upon the weighted average hourly Leq over a 24-hour day, except that an additional +4.77 decibel penalty is applied to evening (7:00 p.m. to 10:00 p.m.) hourly Leq values.

The CNEL was developed for the California Airport Noise Regulations, and is normally applied to airport/aircraft noise assessment. The Ldn descriptor is a simplification of the CNEL concept, but the two will usually agree, for a given situation, within 1 dB. Like the Leq, these descriptors are also averages and tend to disguise short-term variations in the noise environment. Because they presume increased evening or nighttime sensitivity, these descriptors are best applied as criteria for land uses where nighttime noise exposures are critical to the acceptability of the noise environment, such as residential developments.

The State Office of Planning and Research Noise Element Guidelines require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Noise measurements and modeling are used to develop these contours. Significant noise sources include traffic on major roadways and highways, railroad operations, airports, and representative industrial activities and fixed noise sources.

EXISTING CONDITIONS

Noise modeling techniques and noise measurements were used to develop generalized Ldn/CNEL or Leq noise contours for the major roadways in the City of Rocklin planning area for existing conditions. Discussions on noise levels for fixed noise sources in the City General Plan planning area are also provided.

Noise modeling techniques use source-specific data, including average levels of activity, hours of operation, seasonal fluctuations, and average levels of noise from source operations. Modeling methods have been developed for a number of environmental noise sources such as roadways, railroad line operations and industrial plants. Such methods produce reliable results so long as data inputs and assumptions are valid. The modeling methods used in this chapter closely follow recommendations made by the State Office of Noise Control, and were supplemented, where appropriate, by field-measured noise levels to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site-specific.

A community noise survey was also conducted to describe existing noise levels in noise-sensitive areas within the planning area so that noise level performance standards may be developed to maintain an acceptable noise environment.

EXISTING REGULATORY FRAMEWORK

The criteria in the Noise Element are established for determining potential noise conflicts between various land uses and noise sources. They are based on the recommendations of the California State Office of Noise Control as contained in the *Guidelines for the Preparation and Content of Noise Elements of the General Plan.* The standards for all noise sources are based upon the CNEL/Ldn descriptor.

As described earlier, the CNEL and Ldn are 24-hour average noise level descriptors, which assume that individuals are more sensitive to noise occurring during the evening and nighttime hours. The CNEL and Ldn descriptors have been found to provide good correlation to the potential for annoyance from transportation-related noise sources (i.e., roadways, airports and, to a lesser extent, railroad operations). However, these descriptors do not provide a good correlation to the potential for annoyance from non-transportation or stationary noise sources, such as industrial and commercial operations, because many times stationary noise sources operate sporadically or for short durations. Examples of these types of noise sources include loading docks, special event concerts, pressure relief valves or alarms, which tend to be short duration noise events. When applying an Ldn or CNEL descriptor, the noise levels associated with these types of short term operations will be averaged over a 24-hour period, which tends to minimize the actual potential for annoyance.

The State of California "Model Community Noise Control Ordinance" suggests that an exterior hourly L50/Leq noise level of 55 dBA should be used for evaluating stationary noise source impacts during the daytime period (7 am - 10 pm) and 45 dBA during the nighttime period (10 pm - 7 am) within "suburban" areas. The hourly Leq, or hourly average noise level, has been found to provide good correlation to noise sources which operate for a short duration.

Since the Leq is calculated on a logarithmic scale, loud noise levels of short duration are emphasized. For example, a maximum noise level of 70 dBA can only be generated for 2 minutes without exceeding an hourly average (Leq) noise level of 55 dBA. If an on-site noise source generated a noise level of 73 dBA for 1 minute, the hourly average (Leq) noise level would be approximately 55 dBA.

Based upon previous project-specific acoustical analyses within Rocklin, and upon discussions with the City of Rocklin Community Development Department staff, an exterior hourly average noise level criterion of 55 dBA Leq has been applied to stationary noise sources during the daytime period, and a 45 dBA Leq criterion has been applied during the nighttime period.

In some instances, such as second story noise-sensitive rooms, the City staff have requested that an interior noise level criterion be used for evaluating noise. Research indicates that interior noise levels suitable for sleeping areas is within the range of 38 dBA to 48 dBA. The State of California "Model Community Noise Control Ordinance" suggests that an interior maximum noise level (Lmax) of 45 dBA should be used for residential uses between the hours of 10 pm and 7 am. Therefore, the City has used an interior maximum noise level criterion of 45dBA for stationary noise source operations which may occur during the nighttime period.

ROADWAY NOISE LEVELS

The Federal Highway Administration's (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD 77-108) was used to develop Ldn (24-hour average) noise contours for all highways and major roadways in the planning area. The FHWA Model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including the California Department of Transportation (Caltrans). The current version of the model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly Leq values for free-flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict Ldn values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour period.

Traffic data representing annual average traffic volumes for existing conditions were obtained from Caltrans and the General Plan traffic consultant, DKS. Day/night traffic distribution for I-80 and SR 65 were based upon the hourly noise measurement data collected for those roadways. Truck mix data were also based on Caltrans and Bollard & Brennan Inc. file data. Using these data and the FHWA methodology, traffic noise levels as defined by Ldn were calculated for existing traffic volumes. Distances from the centerlines of selected roadways to the 60 and 65 dB Ldn contours are summarized in Table 4-11.

In many cases, the actual distances to noise level contours may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation. The distances reported in Table 4-11 are generally considered to be conservative estimates of noise exposure along roadways in the City of Rocklin.

The effects of factors such as roadway curvature and grade can be determined from site-specific traffic noise measurements. The noise measurement results can be compared to the FHWA model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA model. The differences between the measured and predicted noise levels can be used to adjust the FHWA model and more precisely determine the locations of the traffic noise contours.

Table 4-11
Predicted Existing Traffic Noise Levels (2001)
City of Rocklin

Roadway	Segment	Ldn at 100 feet	Distances to Ldn Contours (feet)	
			60 dB	65 dB
SR 65	North of Sunset Blvd.	75.3 dB	1046	485
	Sunset Blvd. To Blue Oaks Blvd.	75.9 dB	1153	535
	Blue Oaks Blvd. To Pleasant Grove Blvd.	76.3 dB	1224	568
	Pleasant Grove Blvd. To Stanford Ranch Rd.	76.9 dB	1333	619
	Stanford Ranch Rd. To Interstate 80	78.1 dB	1610	747
Interstate 80	Sierra College Blvd. To Rocklin Rd.	77.9 dB	1564	726
	West of Rocklin Rd.	78.7 dB	1764	819
Sierra College Boulevard	Pacific St. to Rocklin Rd.	64.1 dB	188	87
	South of Rocklin Rd.	64.1 dB	188	87
Rocklin Road	East of Sierra College Blvd.	58.9 dB	84	39
	Sierra College Blvd. To El Don Dr.	62.1 dB	137	64
	El Don Dr. to Interstate 80	62.4 dB	145	67
	Interstate 80 to Pacific St.	64.6 dB	203	94
	Pacific St. to 5th St.	56.1 dB	55	26
Granite Drive	Sierra College Blvd. To Rocklin Rd.	58.9 dB	84	39
Pacific Street	Sierra College Blvd. To Dominguez Rd.	62.1 dB	138	64
	Dominguez Rd. to Sunset Blvd.	65.0 dB	216	100
Taylor Road	South of S.R. 65	65.0 dB	216	100
Midas Avenue	Pacific St. to Argonaut Ave.	57.3 dB	66	31

Table 4-11 Predicted Existing Traffic Noise Levels (2001) City of Rocklin				
Roadway	Segment	Ldn at 100 feet	Distances to Ldn Contours (feet)	
			60 dB	65 dB
Sunset Boulevard	Pacific St. to Fairway Dr. Fairway Dr. to Stanford Ranch Rd. Stanford Ranch Rd. to Park Dr. Park Dr. to West Oaks Blvd. West Oaks Blvd. To S.R. 65	64.8 dB 62.9 dB 65.8 dB 64.5 dB 63.3 dB	209 156 243 198 167	97 72 113 92 77
Whitney Boulevard	Springview Dr. to Sunset Blvd.	55.9 dB	53	25
Stanford Ranch Road	S.R. 65 to Fairway Dr. Fairway Dr. to Sunset Blvd. Sunset Blvd. To Park Dr. Park Dr. to West Oaks Blvd. West Oaks Blvd. To Sunset Blvd.	68.8 dB 65.3 dB 63.8 dB 59.5 dB 57.0 dB	384 225 180 92 64	178 104 83 43 30
Park Drive	S.R. 65 to Fairway Dr. Fairway Dr. to Sunset Blvd. Sunset Blvd. To Stanford Ranch Rd.	62.5 dB 61.6 dB 61.4 dB	147 127 123	68 59 57
Wyckford Boulevard	West of Park Dr.	56.1 dB	55	26
Blue Oaks Boulevard	S.R. 65 to West Oaks Blvd.	58.7 dB	82	38
West Oaks Boulevard	Sunset Blvd. To Stanford Ranch Rd.	54.8 dB	45	21
Distances to predicted noise levels are from the roadway centerlines.				

Source: Bollard & Brennan, Inc., 2002

FIXED NOISE SOURCES

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by Federal and State employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels could exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components that may be annoying to individuals who live nearby. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus upon two goals:

1) To prevent the introduction of new noise-producing uses in noise-sensitive areas; and

2) To prevent encroachment of noise sensitive uses upon existing noise-producing facilities.

The first goal can be achieved by applying noise level performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in near proximity to noise-producing facilities include mitigation measures to ensure compliance with noise performance standards.

Fixed noise sources that are typically of concern include, but are not limited to, the following:

HVAC Systems	Cooling Towers/Evaporative Condensers
Steam Valves	Steam Turbines
Generators	Fans
Air Compressors	Heavy Equipment
Conveyor Systems	Transformers
Pile Drivers	Grinders
Drill Rigs	Gas or Diesel Motors
Welders	Cutting Equipment
Outdoor Speakers	Leaf Blowers
Chippers	Loading Docks
Amplified music and voice	Lawnmowers
Car stereos	Modified car mufflers
Sewer Pump Stations/Lift Stations	

The types of uses which may typically produce the noise sources described above include, but are not limited to: wood processing facilities, sewer pump stations, industrial facilities, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, special events such as concerts, and athletic fields.

The City of Rocklin has two primary areas where industrial noise sources exist. Both areas are along Pacific Avenue. For the most part, the lumber manufacturing plants are the primary noise producing sources. These operations include the following:

Pacific MDF Products Inc. – 4315 Dominguez Road
Sierra Pine Limited – 4315 Dominguez Road
Louisiana Pacific - 4385 Pacific Street

Other noise producing uses are also located in these areas, and include the UPS Distribution Center, Meeks Lumber and assorted automotive service facilities.

Sierra Pine

At times, the lumber manufacturing plants will operate 24-hours per day. In the past, the Sierra Pine Limited was a source of numerous noise complaints due to processing facilities. Bollard & Brennan, Inc. has worked with Sierra Pine over the past several years to evaluate noise levels due to the facility. Typical noise level measurements conducted in 1999 indicated that typical hourly noise levels ranged between 59 dB and 65 dB Leq at the closest property lines adjacent to Sierra Pine. Sierra Pine expanded operations in late 1999, and added a new regenerative thermal oxidizer (RTO) exhaust stack which produced objectionable noise levels. Bollard & Brennan, Inc. worked with the City and Sierra Pine to develop a solution to the noise from the RTO stack. As a result, an exhaust silencer was installed in July of 2000. Noise level measurements indicated that noise levels due exclusively to the stack were reduced by approximately 26 dB. Bollard & Brennan, Inc. conducted additional measurements of noise levels due to Sierra Pine, and the resulting overall noise levels have been reduced by approximately 5 dB to 7 dB.

Other Wood Processing Facilities

Other wood processing facilities such as Pacific MDF Products and Louisiana Pacific generally produce noise levels which are masked by background noise from Sierra Pine, local traffic and railroad operations. Typical noise levels in the vicinity of these facilities ranged between 54 dB and 65 dB Leq. The 24-hour Ldn values ranged between 63 and 67 dB in the general vicinity.

RAILROAD NOISE LEVELS

Railroad activity in the City of Rocklin planning area generally occurs along the Union Pacific Railroad (UPRR) mainline railroad tracks. The UPRR mainline track generally runs parallel to the north side of Pacific Street from the SR 65 overpass to Yankee Hill Road. At that point, the westbound track continues to run parallel to Pacific Avenue, while the eastbound track heads in a northerly direction where it enters the Town of Loomis and runs parallel to Sierra College Boulevard.

Noise measurements were conducted at three locations by Bollard & Brennan, Inc. for railroad operations within the planning area adjacent to the UPRR track. The measurements were conducted to determine the contribution of railroad mainline operations to the area noise environment. Instrumentation consisted of LDL Model 820 precision integrating sound level meters. The systems were calibrated before use with a matching acoustical calibrator to ensure accuracy of the measurements.

The purpose of the noise level measurements was to determine typical sound exposure levels (SEL) for railroad line operations in the General Plan study area, accounting for the effects of travel speed, warning horns and other factors which may affect noise generation. In addition, the noise measurement equipment was programmed to identify individual train operations, so that the typical number of train operations could be determined. The data could then be compared to other file data for railroad operational noise levels to better describe the railroad noise environment as it affects the area noise environment, and an annual average Ldn could be calculated.

The railroad noise measurement locations were at Sites A, K & I, as shown on Figure 4-14. The sites generally indicate that up to 24 trains per day may traverse the mainline in both directions. Up to 15 trains per day travel in each direction.

Based upon the noise level measurements, the average SEL for train operations along the main line absent warning horns is 97 dB at 100 feet. The average SEL for train operations near grade crossings where warning horns are used is approximately 106 dB at 100 feet.

To determine the distances to the Ldn railroad contours, it was necessary to calculate the Ldn for typical train operations. This was done using the SEL values and above-described number and distribution of daily freight train operations. The Ldn may be calculated as follows:

$$Ldn = SEL + 10 \log N_{eq} - 49.4 \text{ dB, where:}$$

SEL is the mean SEL of the event, N_{eq} is the sum of the number of daytime events (7 a.m. to 10 p.m.) per day plus ten times the number of nighttime events (10 p.m. to 7 a.m.) per day, and 49.4 is ten times the logarithm of the number of seconds per day. Based upon the above-described noise level data, number of operations and methods of calculation, the Ldn value for railroad line operations have been calculated, and the distances to the Ldn noise level contours are shown in Table 4-12. The calculations are based upon 24 freight train operations a day on the mainline per day for both directions, and randomly distributed throughout the daytime and nighttime hours. There are up to 15 trains per day which may traverse one direction.

Table 4-12
Approximate Distances to the Union Pacific Railroad Noise Contours (2001)

Ldn at 100 feet			Distance to Ldn Contour (feet)					
			With Warning Horns			Without Warning Horns		
Direction	With Warning Horns	Without Warning Horns	60 dB	65 dB	70 dB	60 dB	65 dB	70 dB
Both	77 dB	68 dB	1,400	650	301	341	158	75
East (Yankee Hill Rd.)	75 dB	66 dB	1,000	465	215	251	116	55
West (Pacific St.)	75 dB	66 dB	1,000	465	215	251	116	55

Source: Bollard and Brennan, Inc., 2002.

COMMUNITY NOISE SURVEY

A community noise survey was conducted to document noise exposure in the city containing noise sensitive land uses and for major roadways. Noise monitoring sites were selected to be representative of typical residential, commercial or recreational areas within the city.

Three sets of short-term noise measurements were conducted at eight sites on February 1 through February 12, 2002. Eleven continuous 24-hour noise monitoring sites were also established in the City of Rocklin to record day-night statistical noise level trends. The data collected included the hourly average (Leq) and the maximum level (Lmax) during the measurement period. Figure 4-14 shows the all of the noise monitoring sites. Appendix E shows the results of the monitoring at these sites. Figures graphically showing the results of the noise measurements are included in Appendix E.

Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The results of the community noise survey shown in Appendix E indicate that there are major noise sources in Rocklin, including I-80, SR 65, the Union Pacific Railroad, and some industrial uses which are located in close proximity to noise-sensitive receivers. Measured noise levels within most areas of Rocklin are consistent with a typical suburban community. Recently developed residential areas within the City of Rocklin are generally located away from the major noise sources, or have included noise mitigation in the project designs, so as to reduce overall noise exposure.

NOISE ELEMENT GOALS AND POLICIES

GOAL 1: To protect City residents from the harmful and annoying effects of exposure to excessive noise.

GOAL 2: To protect the economic base of the City by discouraging noise-sensitive land uses from encroaching upon existing or planned noise-producing uses.

GOAL 3: To encourage the application of innovative land use planning methodologies in areas of potential noise conflicts.

Policies

N-1 To determine noise compatibility between land uses, and to provide a basis for developing noise mitigation, an acoustical analysis shall be required as part of the environmental review process for all noise-sensitive land uses which are proposed in areas exposed to existing or projected General Plan horizon (2025) exterior noise levels exceeding the level standards contained within this Noise Element.

N-2 To emphasize site planning and project design to achieve the standards of this Noise Element. The use of noise barriers shall be considered a means of achieving the noise standards; however, the construction of aesthetically intrusive wall heights shall be discouraged.

GOAL 4: To prevent noise-sensitive land uses from being adversely affected by stationary noise sources.

Policies

N-3 To ensure that stationary noise sources do not interfere with sleep, the City of Rocklin shall apply an interior hourly maximum noise level design standard of 45 dBA in the enclosed sleeping areas of residences affected by stationary noise sources. This standard assumes doors and windows are closed.

N-4 To restrict development of noise-sensitive land uses where the noise levels due to existing or planned stationary noise sources will exceed the exterior stationary noise level design standards of the Noise Element, unless effective noise mitigation measures have been incorporated into the project.

N-5 To mitigate noise created by proposed stationary noise sources so that the exterior stationary noise level design standards of the Noise Element are not exceeded.

N-6 To apply the noise level design standards contained within Table 4-13 of the Noise Element to Policies N-4 and N-5 of the Noise Element.

Table 4-13 Exterior Noise Level Design Standards for New Projects Affected by or Including Stationary Noise Sources		
Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	55 dBA	45 dBA

Each of the noise levels specified above shall be lowered by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises (e.g., humming sounds, outdoor speaker systems). These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

The City can impose noise level standards that are more restrictive than those specified above based upon determination of existing low ambient noise levels.

"Fixed" noise sources which are typically of concern include, but are not limited to the following:

HVAC Systems	Cooling Towers/Evaporative Condensers
Pump Stations	Lift Stations
Emergency Generators	Boilers
Steam Valves	Steam Turbines
Generators	Fans
Air Compressors	Heavy Equipment
Conveyor Systems	Transformers
Pile Drivers	Grinders
Drill Rigs	Gas or Diesel Motors
Welders	Cutting Equipment
Outdoor Speakers	Blowers

The types of uses which may typically produce the noise sources described above include but are not limited to: industrial facilities including pump stations, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, businesses using amplified sound systems, car washes, loading docks, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, schools, playgrounds, and athletic fields.

NOTE: The point of measurement for noise levels is at a location at least 5 feet inside the property line of the receiving land use and at a point 5 feet above ground level. In the case of lots where the noise-sensitive use has a reasonable outdoor activity area for outdoor enjoyment, the stationary noise source criteria can be applied at a designated outdoor activity area (at the discretion of the Community Development Director).

GOAL 5: To prevent noise-sensitive land uses from being adversely affected by transportation noise sources.

Note: For the purposes of the Noise Element, transportation noise sources are defined as traffic on public roadways and railroad line operations.

Policies

N-7 To restrict development of noise-sensitive land uses in areas exposed to existing or projected levels of noise from transportation noise sources that exceed the noise level standards contained within the Noise Element, unless the project design includes effective mitigation that results in noise exposure which meets standards.

N-8 To mitigate noise created by new roadway noise sources (e.g., truck routes, roadway improvement projects and new roadways) not contained within the General Plan, so as not to exceed the noise level standards of the Noise Element.

N-9 To provide an analysis for noise impacts to existing noise-sensitive uses that may be exposed to increased noise levels due to required General Plan roadways and roadway improvement projects. The following criteria may be used as a test of significance for roadway improvement projects and new roadways contained within the General Plan:

- Where existing traffic noise levels are less than 60 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +5 dB L_{dn} increase in noise levels due to roadway improvement projects will be considered significant; and

- Where existing traffic noise levels range between 60 and 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in noise levels due to roadway improvement projects will be considered significant; and

- Where existing traffic noise levels are greater than 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a + 1.5 dB L_{dn} increase in noise levels due to roadway improvement projects will be considered significant.

N-10 To apply the noise level design criteria contained within Table 4-14 of the Noise Element to Policies N-7 and N-8 of the Noise Element.

Table 4-14
Maximum Allowable Noise Exposure
Transportation Noise Sources

Affected/Receiving Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL,dB	L_{eq}, dB[2]
Residential	60[3]	45	--
Transient Lodging	65	45	--
Hospitals, Nursing Homes	60[3]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Non-Commercial Places of Public Assembly	60[3]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

Table 4-14
Maximum Allowable Noise Exposure
Transportation Noise Sources

Affected/Receiving Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL,dB	L_{eq}, dB[2]

[1] The outdoor activity area is generally considered to be the location where individuals may generally congregate for relaxation, or where individuals may require adequate speech intelligibility. Such places may include patios of residences, picnic facilities, or instructional areas.

Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.

At the discretion of the City, where no outdoor activity areas are provided or known, only the interior noise level criteria can be applied to the project.

[2] As determined for a typical worst-case hour during periods of use.

[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Note: Existing dwellings and new single-family dwellings on existing lots are not subject to further City review with respect to compliance with the standards of the Noise Element. As a consequence, such dwellings may be constructed in areas where noise levels exceed the standards of the Noise Element.

FUTURE TRAFFIC NOISE CONTOURS

Table 4-15 shows the future traffic noise levels based upon the year 2025. The results of the analysis are based upon inputs to the Federal Highway Administration Traffic Noise Prediction Model (FHWA RD-77-108). Traffic volumes used for the analysis were provided by the General Plan Circulation Element.

The results of the analysis indicate that future traffic noise levels are expected to increase over existing levels between 0.3 dB and 8.8 dB Ldn. The largest increase in traffic noise levels are expected to occur along Blue Oaks Boulevard, Park Drive and Stanford Ranch Road. However, most increases in traffic noise are expected to be less than 5 dB Ldn.

Table 4-15
Predicted 2025 Traffic Noise Levels
City of Rocklin

Roadway	Segment	Ldn at 100 feet	Distances to Ldn Contours (feet)	
			60 dB	65 dB
S.R. 65	North of Sunset Blvd.	79.0	1858	863
	Sunset Blvd. To Blue Oaks Blvd.	79.1	1889	877
	Blue Oaks Blvd. To Pleasant Grove Blvd.	78.7	1754	814
	Pleasant Grove Blvd. To Harding Blvd.	78.8	1787	830
	Galleria Blvd. To Interstate 80	79.6	2023	939
Interstate 80	Sierra College Blvd. To Rocklin Rd	78.6	1747	811
	South of Rocklin Rd.	79.0	1849	858
Sierra College Boulevard	Taylor Rd. to Rocklin Rd.	67.3	307	142
	South of Rocklin Rd.	67.4	311	144
Rocklin Road	East of Sierra College Blvd.	63.3	165	77
	Sierra College Blvd. To El Don Dr.	64.6	202	94
	El Don Dr. to Interstate 80	64.9	211	98
	Interstate 80 to Pacific St.	66.3	263	122
	Pacific St. to 5th St.	59.9	99	46
Granite Drive	Sierra College Blvd. To Rocklin Rd.	62.5	147	68
Pacific Street	Sierra College Blvd. To Dominguez Rd.	64.6	203	94
	Dominguez Rd. to Sunset Blvd.	67.4	311	144
Taylor Road	South of S.R. 65	68.7	380	177
Midas Avenue	Pacific St. to Argonaut Ave.	58.6	80	37
Sunset Boulevard	Pacific St. to Fairway Dr.	68.3	357	166
	Fairway Dr. to Stanford Ranch Rd.	67.7	328	152
	Stanford Ranch Rd. to Park Dr.	69.1	402	187
	Park Dr. to West Oaks Blvd.	68.9	390	181
	West Oaks Blvd. To S.R. 65	67.3	308	143
Whitney Boulevard	Spring View Dr. to Sunset Blvd.	58.1	75	35
Stanford Ranch Road	S.R. 65 to Fairway Dr.	69.3	418	194
	Fairway Dr. to Sunset Blvd.	66.8	285	132
	Sunset Blvd. To Park Dr.	64.2	189	88
	Park Dr. to West Oaks Blvd.	64.4	196	91
	West Oaks Blvd. To Sunset Blvd.	64.7	205	95
Park Drive	S.R. 65 to Fairway Dr.	68.0	340	158
	Fairway Dr. to Sunset Blvd.	64.6	203	94
	Sunset Blvd. To Stanford Ranch Rd.	62.7	151	70
Wyckford Boulevard	West of Park Dr.	56.5	58	27
Blue Oaks Boulevard	S.R. 65 to West Oaks Blvd.	67.5	315	146
West Oaks Boulevard	Sunset Blvd. To Stanford Ranch Rd.	58.4	79	37
Distances to noise contours are relative to the roadway centerlines. Source: Bollard & Brennan, Inc., 2003.				

Table 4-16 is commonly used to show expected public reaction to changes in environmental noise levels. This table was developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 to 70 dBA, as this is the usual range of voice and interior noise levels.

Table 4-16 Subjective Reaction to Changes in Noise Levels of Similar Sources		
Change in Level, dBA	Subjective Reaction	Factor Change in Acoustical Energy
1	Imperceptible (Except for Tones)	1.3
3	Just Barely Perceptible	2.0
6	Clearly Noticeable	4.0
10	About Twice (or Half) as Loud	10.0
Source: Architectural Acoustics, M. David Egan, 1988.		

Where a 5 dB increase in traffic noise levels is predicted to occur within the City of Rocklin, it can be expected that a noticeable increase in traffic noise levels will be subjectively perceived.

The distances to Ldn contours shown on Table 4-15 are used to determine recommended setbacks for new noise-sensitive land uses from the listed roadways.

NOISE ACTION PLAN

Please refer to Chapter II, Summary of Goals and Policies and Action Plan, for the Noise Element Action Plan.